BY ORDER OF THE COMMANDER,
HEADQUARTERS, 11TH WING

BOLLING AIR FORCE BASE
INSTRUCTION 48-3

3 DECEMBER 2003

Aerospace Medicine

IONIZING RADIATION PROTECTION PROGRAM

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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Supersedes BAFBI 48-3, 8 Feb 01 Pages: 10
Distribution: F

This instruction implements **AFI 48-101, 11 July 1994, Aerospace Medical Operations, and AFI 40-201, 1 September 2000, Managing Radioactive Materials in the USAF**. It establishes the procedures and assigns responsibilities for implementing the radiation protection program at Bolling AFB. This applies to all host and tenant units that use radioactive materials or devices that generate radiation. It applies only to ionizing radiation; it does not apply to nonionizing radiation such as lasers or radar. It does not apply to radioactive materials transferred from the Department of Energy to the Department of Defense as parts of nuclear weapon systems, nuclear reactor parts, fuel controlled under Section 91b of the Atomic Energy Act, and Department of Energy activities related to SAFE HAVEN requirements.

1. General Information:

1.1. There are two sources of ionizing radiation to which personnel can be exposed occupationally: Devices that generate radiation and radioactive materials. These devices are managed by Branches in 11th MDG.

1.2. Radioactive material (RAM). Most organizations on base have some items that contain RAM. The majority of materials (such as lensatic compasses and electron tubes) do not require a permit, but some materials do. The Bioenvironmental Engineering Element should be contacted if there are any questions concerning permits.

1.2.1. RAM permits. Organizations that currently have RAM permits issued by the USAF Radioisotope Committee (RIC) are listed below, along with the permitted materials.

1.2.1.1. 11 MDOS/SGOAB (Bioenvironmental Engineering), Cadmium-109 in Niton XL-309 Lead Analyzers

1.2.1.2. 11 CES/CEX (Readiness), Nickel-63 in Improved Chemical Agent Monitors (ICAMS)

1.2.1.3. RAM that does not require a permit still must be controlled in some manner. Use,

storage, and disposition requirements apply.

1.3. All exposures to ionizing radiation shall be as low as reasonably achievable (ALARA) consistent with existing technology, cost, and operational requirements.

2. Responsibilities. Responsibilities concerning RAM are outlined in AFI 40-201. This instruction lists additional responsibilities specific to Bolling AFB.

2.1. HQ 11 WG/CC will appoint in writing a Radiation Safety Officer (RSO) for Bolling AFB. The radiation safety officer is normally the senior ranking person in the Bioenvironmental Engineering Element.

2.2. Squadron Commanders will:

2.2.1. Ensure radiation safety procedures are followed within their squadron.

2.2.2. Ensure all RAM permit requirements are followed.

2.2.3. Ensure the Bioenvironmental Engineering Element is notified of all new RAM or X-ray producing devices used within the squadron.

2.2.4. Apply for RAM permits prior to procurement, storage, or use of the RAM.

2.2.5. Ensure RAM permit renewal applications are made at least 90 days prior to the expiration of the existing permit.

2.2.6. Appoint in writing a permit Radiation Safety Officer (RSO) and authorized users for each permit issued by the USAF RIC and provide a copy of the appointment memorandum to the base RSO (11 MDOS/SGOAB).

2.3. The Commander, 11th Contracting Squadron will:

2.3.1. Ensure contractors using RAM have received approval from the base RSO to use the material on base.

2.3.2. Give the base RSO the authority to conduct periodic checks of contractors using RAM on base IAW AFI 40-201, paragraph 3.3.3.

2.3.3. Give the base RSO the authority to suspend contractor operations involving RAM believed to be unsafe (reference AFI 40-201), paragraph 3.4.4.10.2.5. After suspending contractor operations, the base RSO will notify the Commander, 11th Contracting Squadron as soon as practicable.

2.4. The Commander, 11th Logistics Readiness Squadron (LRS) will:

2.4.1. Ensure RAM is shipped according to US Department of Transportation regulations.

2.4.2. Ensure the Bioenvironmental Engineering Element is notified of all RAM shipments originating from Bolling AFB prior to shipping.

2.4.3. Contact the Bioenvironmental Engineering Element whenever RAM that arrives at or is trans-shipped through Bolling AFB is damaged, is suspected of having surface contamination, or is not labeled correctly.

2.4.4. Ensure the base RSO is notified immediately of any radioactive shipments that arrive damaged that require swipe testing.

2.4.5. Comply with the requisition, receiving, and storage requirements for radioactive materials established by AFI 40-201.

2.5. 11 MDOS/SGOAB through the base RSO, will:

2.5.1. Act as the main point of contact for radiation protection matters.

2.5.2. Perform announced and unannounced radiation protection surveys and other monitoring as required to ensure radioactive sources and materials are being stored and used safely.

2.5.3. Be the main point of contact with the USAF RIC for all radiation protection matters.

2.5.4. Act as the approval authority for the use of RAM by non-Air Force organizations on Bolling AFB.

2.5.5. Have the authority to suspend operations that may be unsafe from a radiation safety tandpoint.

2.6. Permit RSOs will:

2.6.1. Ensure all permit requirements are followed at all times.

2.6.2. Contact the base RSO if any questions or problems arise concerning the permitted radioactive material.

2.6.3. Maintain a binder concerning the radioactive material permit as described in this Instruction.

2.6.4. Be familiar with the requirements of AFI 40-201, especially the permit RSO responsibilities and incident reporting procedures.

2.6.5. Brief the squadron commander annually on the radiation safety program and any problem areas.

2.6.6. Provide the base RSO with a copy of all shipping and transfer paperwork.

Supervisors will:

2.7. Establish and enforce radiation safety procedures.

2.7.1. Ensure radiation safety training is conducted.

2.7.2. Notify the base RSO and the squadron commander of any radiation safety problems.

All personnel using RAM or devices that generate x-rays will:

2.8. Follow established radiation safety procedures.

2.8.1. Notify their supervisor of potential or existing radiation safety hazards.

2.8.2. Notify the Bioenvironmental Engineering Element of any off-duty employment which may involve exposure to radiation.

2.8.3. If pregnant, notify the Public Health Element and supervisor as soon as possible after finding out about the pregnancy.

3. RAM Permit Requirements.

3.1. RAM permits are issued through the USAF RIC. All permit applications shall be submitted to the USAF RIC through the base RSO.

3.2. All questions concerning the RAM permit shall be directed to the base RSO.

3.3. Communication with the USAF RIC. All communication with the USAF RIC shall be coordinated with the base RSO. The only exception is emergency reporting done according to Chapter 3 of AFI 40-201.

3.4. The permit RSO shall be appointed by the squadron commander who meets the requirements specified in permit. Authorized users shall be identified as specified in the permit. The squadron commander shall ensure that the permit RSO and users meet the permit requirements. The permits RSO is responsible for maintaining a binder with permit information. All documentation shall be maintained in the binder for a period of at least three years. The binder shall be organized as follows:

- Tab A Radiation Permit

- Tab B Permit RSO Appointment Memorandum

- Tab C Authorized User’s List

- Tab D Annual Commander’s Briefing

- Tab E Inventory of Radioactive Materials

- Tab F Radiation Surveys (Leak Test and Area)

- Tab G Maintenance and Shipment Records

- Tab H Miscellaneous Documents

- Tab I AFI 40-201

- Tab J BAFBI 48-3

3.5. A nuclear regulating commission (NRC) Form 3 and a supplemental notice regarding the availability of the permit shall be posted in the area where the RAM is stored or used. The supplemental notice shall contain the information in AFI 40-201, paragraph 3.5.3. The permit RSO is responsible for providing the form.

3.6. Storage, disposal, and transfer of RAM shall be accomplished according to the permit. Additional information is provided in this instruction, and questions should be referred to the Bioenvironmental Engineering Element.

4. Use of RAM and Devices which Produce Radiation. RAM and devices which produce ionizing radiation shall be used according to established operating procedures and technical orders. Supervisors shall establish operating procedures if they do not exist already. All locally developed operating procedures shall be approved by the base RSO before implementation. Deviation from these procedures could result in exposures to radiation that are not ALARA.

4.1. Exposure to ionizing radiation shall be minimized to an ALARA level when using RAM or devices that produce ionizing radiation. There are three ways to reduce radiation exposure: time, distance, and shielding.

4.1.1. Time. The amount of time to which personnel are exposed to ionizing radiation should be minimized whenever possible. This will minimize the person's cumulative exposure.

4.1.2. Distance. Radiation levels decrease with distance. The farther the person is from the source, the smaller the radiation exposure.

4.1.3. Shielding. Shielding is used to reduce the amount of ionizing radiation. It is effective for x-ray and gamma radiation sources. When shielding is present to minimize exposure, it shall be used.

4.2. Radioactive materials shall not be applied to people or clothing except as part of a diagnostic process.

5. Use of RAM or Devices which Produce Radiation by non-Air Force Organizations. Any use of RAM or devices which produce x-ray radiation by non-Air Force organizations on Bolling AFB shall be approved by the base RSO.

5.1. Non-Air Force organizations, including contractors, who plan on using RAM or devices, which produce x-ray radiation on base, shall notify the base RSO in writing. Notification for RAM use by contractors shall be done in accordance with AFI 40-201, paragraph 3.4.18.2, at least 30 calendar days before bringing the materials on base. **Attachment 2** is an information sheet that can be given to contractors to assist in this notification.

5.2. 11 MSG/CC and 11 CES/CEX will be informed by the base RSO when non-Air Force organizations are approved to use RAM on base.

6. Storing RAM.

6.1. Radiation storage areas are classified as "restricted" or "unrestricted" according to AFI 40-201. The classification is dependent on the radiation exposure levels measured in the storage area. The base RSO determines the storage area classification. Even if RAM is stored in an "unrestricted" area, provisions shall be established to prevent unauthorized removal of RAM.

6.2. All commodities that contain RAM shall be labeled unless exempted by technical order or regulation.

7. Shipping RAM.

7.1. Instructions for shipment of a particular RAM may be specified in a technical order or other directive. If this is the case, those instructions shall be followed in addition to the requirements in this instruction.

7.2. Before shipping RAM, the organization that will be shipping the RAM shall contact the Bioenvironmental Engineering Element for packaging, labeling, and other shipping requirements.

7.3. 11 LRS/LGT will notify the Bioenvironmental Engineering Element of all RAM shipments originating from Bolling AFB. It is the 11th LRS/LGT personnel’s responsibility to ensure RAM is shipped according to Department of Transportation regulations. As a check, Transportation Element personnel assigned to LRS will contact the Bioenvironmental Engineering Element prior to shipment to do a quality control check of the shipment. Normally, no specific actions need to be taken when RAM is trans-shipped through Bolling AFB. However, the Bioenvironmental Engineering Element shall be contacted whenever RAM that is trans-shipped is damaged, is suspected of having surface contamination, or is not labeled correctly.

8. Transporting RAM on Public Roads. In some situations, it may be necessary for base personnel to transport RAM on public roads off base in government or privately owned vehicles. Whenever this occurs, the Department of Transportation requirements (including labeling) apply. Organizations that may transport radioactive materials on public roads must contact the Bioenvironmental Engineering Element for additional information on labeling and transportation requirements. Organizations shall obtain approval from the Bioenvironmental Engineering Element before transporting RAM off base.

9. Receiving RAM. All RAM shipped with a DOT radioactive symbol (white I, yellow II, or yellow III) shall be checked for contamination with a survey meter within 3 hours after received if a duty day or within 3 hours of the start of the next duty day. Contact the Bioenvironmental Engineering Element if the organization does not have the capability to do this monitoring. Monitoring shall be documented; the documentation shall include the instrument used, calibration date, date and time monitored, and person performing the monitoring.

10. RAM Disposition.

10.1. All disposition of excess RAM shall be coordinated with the base RSO. Specific disposition procedures depend on the isotope, activity, and physical state of the RAM.

10.2. Some lensatic compasses and other RAM can be recycled through Wright-Patterson AFB. All recycling shall be coordinated with the base RSO.

11. Monitoring. Radiation monitoring will be conducted by Bioenvironmental Engineering Element. In some workplaces (such as Medical Radiology), personnel may also conduct radiation monitoring whenever they use devices that produce x-ray radiation. Monitoring methods include the use of thermoluminescent dosimeters (TLDs), radiation survey meters, pocket dosimeters, and alarms.

11.1. TLDs. Personnel who must wear TLDs are identified by the Bioenvironmental Engineering Element.

11.1.1. TLDs are worn by personnel who use RAM or devices, which produce x-ray radiation in the 11 MDSS Radiology/Medical Equipment Repair Center.

11.1.2. The supervisor is responsible for identifying all personnel who are required to wear a TLD to the Bioenvironmental Engineering Element. Before issuing a TLD, the Bioenvironmental Engineering Element must enroll the individual in the program and conduct training. This process takes about 20 minutes, and is done by appointment only. An appointment may be scheduled by contacting 11 MDG/SGOAB.

11.1.3. All personnel who wear TLDs shall do so according to instructions. TLDs shall be stored with the control badge when not in use.

11.1.4. Pregnancy. If a woman who is on the TLD program becomes pregnant, she shall notify the 11 MDG Public Health Element and her supervisor of the pregnancy.

11.1.5. Off-duty employment. The Bioenvironmental Engineering Element must be notified of any off-duty employment involving RAM.

11.2. Results of monitoring, including dosimeter and survey results, are available for review in the Bieonvironmental Engineering Element office.

12. Training. Results of monitoring, including dosimetry and survey results, are available for review in the Bioenvironmental Engineering Element office. Personnel who use permitted RAM or x-ray-producing devices require initial and annual radiation safety training. Initial training on radiation safety is normally conducted as a part of a person's formal technical training, and will be supplemented as necessary by the person's initial workplace safety training provided by the supervisor. Annual training may be provided either by the shop supervisor or the base RSO.

12.1. The supervisor is responsible for ensuring training is conducted. Training documentation shall be maintained by the supervisor.

12.2. Annual training may be conducted by the base RSO or the supervisor. Both may participate in the training.

12.2.1. If the base RSO will perform the annual training, the supervisor shall notify the base RSO of training requirements at least 3 weeks in advance of training. The supervisor shall schedule all personnel for training and ensure they attend.

12.2.2. The supervisor may conduct the annual training only if all of the conditions below are met:

12.2.2.1. The person conducting the training has the necessary experience and understanding of radiation safety principles to conduct the training. The base RSO shall determine if the person meets this requirement.

12.2.2.2. A detailed lesson plan is developed for the training. (The base RSO can assist in the development of this lesson plan.)

12.2.2.3. The lesson plan is approved by the base RSO.

12.2.2.4. If a RAM permit exists for the workplace, the lesson plan covers the permit requirements and the location and content of the permit RSO's binder required by paragraph **3.5.** of this Instruction.

12.2.2.5. A list of personnel trained is forwarded to 11 MDOS/SGOAB upon completion of training. The list shall include the name of the individuals trained, the date training was conducted, and the name of the individual who performed the training.

13. RAM Incidents and Accidents.

13.1. Any incidents or accidents shall be reported to the base RSO and supervisor immediately.

13.2. Loss or theft of RAM shall be reported to the base RSO, supervisor, and Security Forces Squadron immediately.

14. Radioluminescent Exit Signs.

14.1. No new radioluminescent exit signs shall be installed or be used on base. Existing exit signs shall be taken out of service as soon as practicable and feasible. All exit signs taken out of service shall be turned in to the Bioenvironmental Engineering Element.

14.2. The managers of buildings with radioluminescent exit signs shall comply with the following:

14.2.1. DO NOT attempt to repair the exit sign if the sign no longer illuminates. NEVER try to open the sign.

14.2.2. DO NOT remove the exit signs. Submit a work order to remove it.

14.2.3. DO NOT dispose of the exit signs. The signs MUST be disposed of as radioactive material. Bring the exit sign to the Bioenvironmental Engineering Element (Bldg 603) during normal duty hours for proper disposition.

WILLIAM A. CHAMBERS, Colonel, USAF
Commander

Attachment 1

GLOSSARY OF REFERENCES, ACRONYMS, AND TERMS

References

AFI 48-125, *The US Air Force Personnel Dosimetry Program*

Title 10, Part 19, Code of Federal Regulations, "Notices, Instructions and Reports to Workers: Inspection and Investigation."

Title 10, Part 20, Code of Federal Regulations, "Standards for Protection Against Radiation."

Abbreviations and Acronyms

RAM—Radioactive material

RIC—Radioisotope Committee

RSO—Radiation safety officer

Terms

NOTE: See AF1 40-201, for additional terms.

Base RSO—The base RSO is normally the senior ranking person in the 11 MDOS Bioenvironmental Engineering Element. This person runs the base's radiation safety program. Contact the base RSO at 11 MDOS/SGOAB.

Permit RSO—A permit RSO is required for each RAM permit issued by the USAF Radioisotope Committee (RIC). The RSO is usually the person in the using organization who has control over the RAM. The USAF RIC establishes qualifications for permit RSOs. If no one within the using organization meets the qualifications, a qualified person from the Bioenvironmental Engineering Element will be appointed as the RSO.

Radiation safety officers—There are two types of radiation safety officers, the base RSO and the permit RSO.

Attachment 2

REQUIREMENTS FOR CONTRACTORS WHO BRING RADIOACTIVE MATERIALS ON BASE

The following information must be provided to the Bioenvironmental Engineering Element, 11 MDOS/ SGOAB before a contractor may bring a radioactive material onto Bolling Air Force Base. This is an Air Force requirement established by Air Force Instruction 40-201, Managing Radioactive Materials in the USAF. *NOTE: This is required, regardless of whether or not the NRC or the District of Columbia requires a license.*

- A brief description of the proposed activities

- The dates the radioactive material will be used on base

- The name of the contractor and contracted project under which the work is being done

- A copy of the NRC or Agreement State license authorizing the use of the radioactive materials (if one is required)

- The name, local address, and telephone number of the responsible local representative and the name, address, and telephone number of the radiation safety officer (if there is an NRC license, this must be the person specified on the license)

- An acknowledgment the base radiation safety officer can make periodic checks to ensure contractor personnel follow radiation safety practices to prevent exposures to Air Force personnel and avoid contamination of government property